

SUMMARY OF 1988 GYPSY MOTH SUPPRESSION
ACTIVITIES

Rock Creek Park
Washington D.C.

Chesapeake and Ohio Canal National Historical Park
Sharpsburg, Maryland

George Washington Memorial Parkway
McLean, Virginia

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SUMMARY OF 1988 GYPSY MOTH SUPPRESSION ACTIVITIES

Rock Creek Park, Washington D.C.

C & O Canal National Historical Park
Sharpsburg, Maryland

George Washington Memorial Parkway
Arlington, Virginia

On Saturday April 30, 1988, 48 acres in Rock Creek Park were treated with the gypsy moth nucleopolyhedrosis virus (NPV) product, GYPCHEK. On May 1, 1988, the remaining 467 acres in Rock Creek Park, 395 acres along the C&O Canal and 185 acres on the George Washington Memorial Parkway were treated with Bacillus thuringiensis (B.t.). On May 9 or May 11, these same areas received a second application of GYPCHEK or B.t.

Several other park-sites were cooperatively treated by other agencies. On May 2, 229 acres of Rock Creek Park were treated with B.t. by the District of Columbia, Department of Public Works. On May 14, Normanstone Park (17 acres) was treated with B.t. by the Department of Navy during their project at the Naval Observatory. Several other park sites in northern Virginia and western Maryland were treated by State and/or county agencies, but will not be discussed in this report.

The suppression projects were conducted cooperatively by the National Park Service, assisted by the USDA Forest Service, the U.S. Navy, the D.C. Department of Public Works, and the D.C. Department of Consumer and Regulatory Affairs.

Agency Contacts

USDI National Park Service:

Center For Urban Ecology

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Contractors:

Joe Cordoba
Cordoba Helicopter
Enterprises, Inc.

Tim Voss
Ag-Rotors, Inc

Fred Hudson
Commonwealth Jet
Services Co.

Agency Responsibilities

USDI National Park Service:

The National Park Service planned and supervised the project. NPS provided the ground crew to deploy balloons; monitored larval and foliage development; mixed the Gypchek; and monitored insecticide coverage. NPS provided the mixing and loading site. An NPS employee rode in the observation helicopter to monitor the application. NPS also monitored the effectiveness of the spray project.

Park Police:

The Park Police provided personnel to observe and monitor aircraft safety during the spray operations. They also provided a pilot and helicopter for the defoliation survey conducted by the Forest Service and Park Service in June.

USDA Forest Service:

The Forest Service was the technical consultant on the project. They participated in the contract development, offering advice on necessary documentation needed. They supervised mixing and loading of the insecticide; and provided the Gypchek.

D.C. Tree Crew, Department of Public Works:

The District of Columbia incorporated 229 acres of Rock Creek Park in their contract. They encouraged public involvement and public meetings.

D.C. Department of Consumer and Regulatory Affairs (DCRA):

DCRA monitored contractor compliance with D.C. pesticide laws and regulations. Their personnel monitored the mixing and loading operations, and insecticide deposition within the target areas.

US Navy:

The US Navy arranged FAA approval to fly over the Naval Observatory and to treat Normanstone Parkway.

Cordoba Helicopter Enterprises Inc. and Ag-Roters Inc.:

They provided all of the equipment and personnel for mixing, loading, and applying the insecticide. In advance of treatment, they provided aircraft for calibration and characterization. Their primary responsibility was to provide a quality and efficacious application of insecticide to the target areas.

Commonwealth Jet Services Co.:

Provided a OSA approved chase helicopter and pilot. The helicopter and pilot did the aerial preflight and guided the spray helicopter to the treatment blocks.

Insecticide-Cordoba

The B.t. formulation Dipel 8L was applied at the rate of 12 BIUs (Billion International Units) in 96 oz. of total mix per acre. BOND sticker was added to the tank mix at the rate of 2 percent by volume. The spray mix was prepared in the following sequence:

70 oz. Water
2 oz. BOND
24 oz. B.t. Dipel 8L

The insecticide and sticker were supplied by the contractor.

The nucleopolyhedrosis virus product GYPCHEK was provided by the USDA Forest Service. The material was mixed by the NPS. GYPCHEK was applied at the rate of 5x10" polyhedral inclusion bodies (PIBs) in 1.5 gallons of total mix per

acre. Rhoplex sticker was added at the rate of 2 percent by volume. Orzan, an ultraviolet sunscreen, was added at 6 percent by weight volume and 12.5 percent molasses by volume. The mix was prepared as follows:

71.00 gal. Water (nonchlorinated)
41.25 lbs. of Orzan LS
10.30 gal. Molasses

1.65 gal. Rhoplex B60A
550.00 g. GYPCHEK

Insecticide-Ag Rotors Inc.

The District of Columbia used an aqueous formulation of B.t., Dipel 8AF. The B.t. was applied at the rate of 12 BIUs in 96 oz. of total mix per acre. BOND was added to the mix at the rate of 2 percent by volume. The spray mix was prepared in the following sequence:

70 oz. Water
2 oz. BOND
24 oz. B.t. Dipel 8AF

The insecticide and sticker were supplied by the contractor.

Calibration and Characterization

The following is a summary of the calibration data (also see Appendix, Tables 15a and 15b):

	Cordoba	Ag-Rotors
Aircraft:	Sikorsky 55	Bell 212
FFA #:	N6704	N8530B
Speed:	75 mph	90 mph
Swath:	150 feet	200 feet
Coverage:	22.5 acres/minute	36.4 acres/minute
Flow rate:	17.04 gallons/minute	27.3 gallons/minute
Nozzles:	43-8004 flat fan	68-8004 flat fan
Orientation:	90 degrees down	45 degrees forward
Pressure:	38 psi	40 psi

Areas Treated

Maps of the treatment areas are appended to this report (Figures 1-6). Specific treatment areas are discussed below.

Rock Creek Park.--The area in Rock Creek Park consisted of 10 blocks totalling 1347 acres (Figures 1-2). Seven areas were treated by Cordoba. Two of these totalling 48 acres were treated with GYPCHEK. These were Pinehurst Parkway (18 acres) and the Nature Center Block near West Springs (30 acres). Both were treated with two applications of GYPCHEK.

The other 5 areas treated by Cordoba were: Piney Branch Parkway, 36 acres, Soapstone Valley, 24 acres, Nature Center Block, 326 acres, Hazen Park, 10 acres, and Picnic Groves 6-10, 71 acres. These areas were sprayed twice with B.t.

Four blocks in Rock Creek Park were treated by Ag-Rotors (DC contract). These were: The 16th Street fringe, 15 acres; Northern Floodplain, 143 acres; Battery Kemble Park, 57 acres; and, the Fulton Connector, 14 acres. The 16th Street fringe and the Northern Floodplain were only treated once while the other two were treated twice.

The last area, Normanstone Parkway (17 acres), was also treated by Ag-Rotor, Inc., but under the Navy contract.

C & O Canal.--There were three blocks treated along the C & O Canal by Cordoba (Figure 4-6). These were: Great Falls Tavern, 10 acres; Violettes Lock, 35 acres; and Dickerson Warm Water area, 350 acres. All blocks received two applications of B.t.

George Washington Memorial Parkway.--Three areas were treated by Cordoba (Figure 3). These were: Arlington Forest and Memorial Drive, 45 acres; Theodore Roosevelt Island, 65 acres; and Glen Echo, 75 acres. Theodore Roosevelt Island and Glen Echo were treated twice and Arlington Forest and Memorial Drive were treated twice--first during the Arlington County (VA) Program and second by NPS. A total of 325 acres were treated with 244 gallons of mixed B.t.

Application Data and Weather Conditions

The loading records (sortie reports) and weather data collected during the project are appended to this report (Tables 16-18). On Saturday April 30, project personnel arrived on site at 3:30 am to begin preparing the GYPCHEK mix. It was chilly and breezy at that time. The decision was made to go ahead with the GYPCHEK application. The material was applied shortly after dawn. NPS and Forest Service personnel monitored the application from the observation aircraft in order to evaluate how well the GYPCHEK was settling in the intended areas. In both blocks the spray material was quickly settling. Evaluation of spray deposit cards later confirmed this. At the time of application the wind speed measured at the landing zone registered 10-12 mph. Shortly after application the winds increased in strength with gusts exceeding 14 mph. We decided to quit for the day and to begin the B.t. work the following morning.

The B.t. applications commenced on Sunday May 1 at 0625 hours. Treatments were completed by early afternoon. Minor delays occurred when the pilot had to stop and clean the screens in the spray system; when the observation aircraft had to get fuel at the National Airport; and when moving to the Whites Ferry landing zone. Weather conditions during the project were excellent. The last weather reading just before noon time gave a temperature of 67 degrees F, relative humidity of 54% and very light winds from the west.

The second GYPCHEK and B.t. applications commenced on May 9. Weather conditions at dawn were excellent with temperature at 55 degrees F, relative humidity 50%, and the winds not measureable. GYPCHEK was applied first and was

completed by 0624 hours. The B.t. applications began at 0638 hours and preceeded until about 8 am. At that time the pilot reported a mechanical problem with the aircraft and took it across town and landed at the College Park (MD) Airport. The project was eventually cancelled for the remainder of

the day while the helicopter was being repaired. A total of 314 acres were treated that day. About 2100 hours a light rain shower occurred.

On May 11, the B.t. project was completed without incident. Temperatures were in the 60's, relative humidity about 70 percent, and winds light.

Insect and Foliage Development

Insect and foliage development were monitored in Pinehurst Parkway area (Tables 1-14) weekly beginning on April 6. Below is a summary of development on the last two monitoring dates.

<u>Date</u>	<u>Foliage Development</u>	<u>Larval Development</u>
4/22	Red Oaks 50% White Oaks 25%	100% 1st Instar
4/30	Red Oaks +50% White Oaks 50%	40% 1st Instar 60% 2nd Instar

At the time of treatment, all egg hatch was completed and larvae had dispersed.

Treatment Area Marking

National Park Service personnel marked the treatment areas with yellow or white helium-filled balloons. Balloon locations are identified on the spray block maps appended to this report.

Treatment Monitoring

National Park Service personnel monitored insecticide application and deposition from an observation helicopter that accompanied the spray helicopter. Ciba-Geigy water sensitive cards and white or black kromekote cards were set out in 8 treatment areas. Spray cards were not deployed in Battery Kemble and Hazen Park.

Pinehurst Parkway.--Spray cards were set out on both spray dates, April 30 and May 9. Two card lines were set up, one along a trail from Aberfoyle to Beech Street. Cards were 20 feet apart. Canopy cover was from 20 percent or less. Some cards were placed in an open area. All cards showed deposition, except two cards, one near the road and the other across the street outside the spray block. The second card line was in the woods from Beech Street to an adjacent landowner's backyard. All cards showed deposition. The canopy cover along the second cardline was greater than 50 percent.

Nature Center Block.--Spray cards were deployed 30 feet apart along a footpath in the GYPCHK area for both treatments. There was approximately 40 percent canopy cover. All cards collected spray deposit.

Picnic Groves 6-10.--Spray cards were set out 30 feet apart on both spray dates, May 1 and May 9. The card line ran from the creek across the road into the woods at picnic grove 9. Most of the cards had little or minimal (10 percent) canopy cover along the line. Two cards were deployed in the woods under approximately 50 percent canopy cover. All cards picked up insecticide deposit.

Soapstone Valley.--Cards were deployed in this area for both applications. They were positioned 30 feet apart from the end of Linnean Street down to the stream at the bottom of the hill. Canopy cover ranged from 0 to 60 percent. All cards recorded spray deposit.

Theodore Roosevelt Island.--Spray cards were set upon both spray dates, May 1 and May 9. Cards were put out 50 feet apart on a trail that circles the island. Cards had a slight 20 percent or less canopy cover. All cards recorded spray deposit.

In the remaining areas, spray cards were deployed only once, either on May 1 or on May 2 (DC Contract).

Piney Branch Parkway.--Cards were positioned 30 feet apart beginning at the apartment complex, across the road and stream, and into the woods. Cards on one side of the road had no canopy cover; they collected a nice spray deposit. The cards on the other side of the road, which had a canopy cover of more than 50 percent, also collected spray deposit.

Northern Floodplain.--Cards were deployed along the Valley trail along Parkside Drive. The canopy over the trail is about 30 percent. All cards showed nice uniform droplets.

16th Street Fringe.--Cards were set out 20 feet apart from Holly Street extending into the woods. The canopy cover was 50 percent. All cards showed some deposition.

Normanstone Parkway.--Normanstone Parkway was treated on May 14 by the Navy contractor, Ag-Rotors. Cards were set out 30 feet apart from Massachusetts Avenue to Normanstone Drive. The cards were positioned along a trail, but the canopy cover over this trail was about 50 percent or more. All cards showed deposition.

Some treatment areas were monitored with burlap bands for larval development, especially in the GYPCHEK treated areas. All areas have male moth trapping points, and will have egg mass surveys done by the 1/40th acre plot method and 5 minute walks. An aerial defoliation survey was performed on June 30. No defoliation was detected within any of the treated areas in Rock Creek Park, George Washington Memorial Parkway, or the lower C&O Canal. Defoliation was noted outside the treatment area at Great Falls Tavern Parking area, and just inside the treatment area by the power lines at the Dickerson Warm Water area.

DISCUSSION

Compared to the previous year's project, the 1988 program was beset with problems and delays. Besides unfavorable weather at times, there were major delays due to mechanical failures of the aircraft, and minor delays during application that prevented us from obtaining a nice, consistent production rate from the aircraft. Also affecting the production rate was a monitor aircraft that periodically had to leave the job and fly to National Airport for fuel. On at least one occasion, we had to shut down the spray contractor for nearly 30 minutes while waiting for the monitor ship to return.

In spite of these problems, the operation, when functioning, went satisfactorily and even smoothly. The excellent treatment conditions experienced on May 1 allowed us to complete the entire first application of B.t. even as the operation was experiencing minor delays along the way that cut into production. Clearly, had Mother Nature not been so accommodating, it would have taken at least 2 days to complete the first application of B.t. Contributing greatly to the successful completion of the project was an experienced pilot in both the spray and monitor aircraft. In addition, we found that the pre-treatment over flights of the treatment areas with both pilots helped to familiarize them with the block locations and boundaries.

The delays that we experienced increased everyone's frustration level, but did not prevent the treatment from being applied during the proper biowindow. The defoliation surveys conducted in June and July showed that the treatments protected the tree foliage in all blocks save one small area in the Dickerson Tract. We can, nevertheless, consider the project to have successfully met the desired objective. Egg mass counts will be conducted later this fall to determine how well gypsy moth populations were controlled.

Everyone involved in this project should be commended for their patience, perseverance, and commitment to complete the tasks at hand.

RECOMMENDATIONS

Several conclusions and subsequent recommendations can be drawn from the 1988 project.

1. Continue the use of a monitor aircraft. The value of this aircraft to the successful completion of the project became apparent very quickly. Future contracts should specify that the contractor provide the monitorship; however, we learned some valuable lessons in this regard that we need to take into consideration. These are:
 - a) specifying the type of monitor aircraft desired (i.e. 2 passenger, 3 passenger, etc.);
 - b) specifying that a fuel source for the monitor ship be located at the LZ during the project to prevent delays; and,
 - c) working with OSA and the contractor to ensure that NPS regulations are met.
2. Should NPS decide to go with a competitively bid contract again, we will need to scrutinize and modify the aircraft and application

specifications. Tightening up these specifications could minimize the potential for delays caused by minor malfunctions of the spraying

system. In addition, we should work with the NPS contracting office to develop some performance standards that can be used to evaluate bidders. In this way, we can begin to get away from awarding contracts solely on the basis of lowest bid price.

3. Finally, NPS should again consider riding on existing contracts where appropriate. This was done for several areas of Rock Creek Park that were adjacent to those that were planned for treatment by the City of Washington, DC. In the future, it may be more advantageous to work cooperatively with the city on all treatment areas.

APPENDIX

Tables 1-14	Larval and Foliage Data Sheets
Table 15a & b	Aircraft Calibration Worksheets
Tables 16-18	Sortie Reports
Figures 1-2	Rock Creek Park Treatment Areas
Figure 3	George Washington Memorial Parkway Treatment Areas
Figures 4-6	C & O Canal Treatment Areas

TABLE 1

SITE:
TRANSECT: Aberfogle

DATE: 4/16/88
MONITOR: C. S. C. H.

EGG HATCH? Y (N)
<50% HATCH: Y N
>50% HATCH: Y N
EGGMASS LOCATION: (SUNNY) SHADY BOTH

LARVAE DISPERSING? Y (N)
<50% LARVAE DISPERSED? Y N
>50% LARVAE DISPERSED? Y N
WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100).

PARASITISM? (Y) N

LIST PARASITES:

PREDATION? Y N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK ✓

RED OAK ✓

OTHER ✓

COMMENTS:

TABLE 2

SITE:
TRANSECT:

Beach 61.

DATE: 4/6/88
MONITOR: C. G. C. H.

EGG HATCH?	Y	(N)
<50% HATCH:	Y	N
>50% HATCH:	Y	N
EGGMASS LOCATION:	SUNNY	SHADY (BOTH)

LARVAE DISPERSING?	Y	(N)
<50% LARVAE DISPERSED?	Y	N
>50% LARVAE DISPERSED?	Y	N

WHAT PERCENT AT 1st INSTAR?
(count 100) 0
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM? (Y) N

LIST PARASITES: C. encurtus

PREDATION? Y N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK

✓

RED OAK

/

OTHER

COMMENTS:

✓

TABLE 3

SITE:
TRANSECT: *Aber Fyfe*

DATE: *4-11-88*
MONITOR: *C.S. ICH.*

EGG HATCH? ☒ Y ☐ N
<50% HATCH: ☐ Y ☒ N
>50% HATCH: ☒ Y ☐ N
EGGMASS LOCATION: ☒ SUNNY ☐ SHADY ☐ BOTH

LARVAE DISPERSING? ☐ Y ☐ N
<50% LARVAE DISPERSED? ☐ Y ☐ N
>50% LARVAE DISPERSED? ☐ Y ☐ N

WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

5%

5% Relat. 6.2

PARASITISM? ☐ Y ☐ N

LIST PARASITES:

PREDATION? ☐ Y ☐ N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK

RED OAK

OTHER

COMMENTS:

✓

✓

✓

TABLE 4

SITE: Beech St.
TRANSECT:

DATE: 4-71-8P
MONITOR: C. Smith

EGG HATCH? ☒ Y ☐ N
<50% HATCH: Y ☒ N
>50% HATCH: ☒ Y ☐ N
EGGMASS LOCATION: ☒ SUNNY ☐ SHADY ☐ BOTH

LARVAE DISPERSING? Y ☒ N
<50% LARVAE DISPERSED? Y ☐ N
>50% LARVAE DISPERSED? Y ☐ N

WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

5%

about 10%

PARASITISM? Y N

LIST PARASITES:

PREDATION? Y N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%
WHITE OAK		✓			
RED OAK				✓	
OTHER				✓	

WHITE OAK

RED OAK

OTHER

COMMENTS:

TABLE 5

SITE: Beech Street
TRANSECT: 17A

DATE: 4-15-88
MONITOR: LSKH

EGG HATCH?	Y	(N)
<50% HATCH:	Y	N
>50% HATCH:	Y	N
EGGMASS LOCATION:	(SUNNY)	SHADY BOTH

LARVAE DISPERSING?	Y	(N)
<50% LARVAE DISPERSED?	Y	N
>50% LARVAE DISPERSED?	Y	N
WHAT PERCENT AT 1st INSTAR? (count 100)		
WHAT PERCENT AT 2nd INSTAR? (count 100)		
WHAT PERCENT AT 3rd INSTAR? (count 100)		

PARASITISM? Y N

LIST PARASITES:

PREDATION? Y N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK

RED OAK

OTHER

COMMENTS:

✓

✓

✓

TABLE 6

SITE: Abarro, 12
TRANSECT: 108A

DATE: 4-15-88
MONITOR: C. G. C. W.

EGG HATCH? ☒ Y ☐ N
<50% HATCH: Y ☒ N
>50% HATCH: ☒ Y ☐ N
EGGMASS LOCATION: ☒ SUNNY ☐ SHADY ☐ BOTH

LARVAE DISPERSING? Y ☒ N 2nd instar hatched
<50% LARVAE DISPERSED? Y ☐ N
>50% LARVAE DISPERSED? Y ☐ N
WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM? Y ☐ N

LIST PARASITES:

PREDATION? Y ☐ N

LIST PREDATORS:

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%
WHITE OAK				✓	
RED OAK				✓	
OTHER					✓
COMMENTS:					

TABLE 7

SITE: *Pinehurst Play*

DATE: 4-19-88

TRANSECT: *Beech St*

MONITOR: *CS*

EGG HATCH?

(Y)

(N)

<50% HATCH

Y

(N)

>50% HATCH

(Y)

N

LARVAE DISPERSING?

Y

(N)

>50% LARVAE DISPERSED?

Y

N

<50% LARVAE DISPERSED?

Y

N

WHAT PERCENT AT 1st INSTAR?
(count 100)

WHAT PERCENT AT 2nd INSTAR?
(count 100)

WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM?

Y

(N)

LIST PARASITES

PREDATION?

Y

N

LIST PREDATORS

HOST

BUDS
SWELLING

BUDS
BREAKING

LEAF EXPANSION
<25% 25-50% >50%

WHITE OAK

✓

RED OAK

✓

OTHER

✓

COMMENTS

a

TABLE 8

SITE: *Pinehurst Pkwy*

DATE: *4-14-88*

TRANSECT: *Alexander*

MONITOR: *CS*

EGG HATCH?	☒ Y	☐ N
<50% HATCH	☐ Y	☒ N
>50% HATCH	☒ Y	☐ N

LARVAE DISPERSING?	☐ Y	☒ N
>50% LARVAE DISPERSED?	☐ Y	☐ N
<50% LARVAE DISPERSED?	☐ Y	☐ N

WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM?	☐ Y	☐ N
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LIST PARASITES

PREDATION?	☐ Y	☐ N
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LIST PREDATORS

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK

RED OAK

OTHER

COMMENTS

✓
✓
✓

TABLE 9

SITE: Northern Floodplain

DATE: 4-22-88

TRANSECT: Wise Rd

MONITOR: JS+CH, LS

EGG HATCH? ☒ Y N

<50% HATCH ☒ Y N

>50% HATCH Y N

LARVAE DISPERSING? ☒ Y N

>50% LARVAE DISPERSED? Y N

<50% LARVAE DISPERSED? ☒ Y N

WHAT PERCENT AT 1st INSTAR?
(count 100) 100%

WHAT PERCENT AT 2nd INSTAR?
(count 100)

WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM? Y ☒ N

LIST PARASITES

PREDATION? Y ☒ N

LIST PREDATORS

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK ✓

RED OAK ✓

OTHER ✓

COMMENTS

TABLE 10

SITE: Boundary Bridge
TRANSECT: Northern Floodplain

DATE: 4-22-88

MONITOR: JS-CH

EGG HATCH?	(Y)	N
<50% HATCH	(Y)	N
>50% HATCH	Y	N

LARVAE DISPERSING?	(Y)	N
>50% LARVAE DISPERSED?	Y	N
<50% LARVAE DISPERSED?	(Y)	N

WHAT PERCENT AT 1st INSTAR?
(count 100) 100%
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM?	Y	N
LIST PARASITES		
PREDATION?	Y	N
LIST PREDATORS		

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK

RED OAK

OTHER

COMMENTS

TABLE 11

SITE: 16th Street fringe

DATE: 4-22-88

TRANSECT: Holly Street

MONITOR: JSC+CH

EGG HATCH?	(Y)	N
<50% HATCH	(Y)	N
>50% HATCH	Y	(N)

LARVAE DISPERSING?	(Y)	N
>50% LARVAE DISPERSED?	Y	N
<50% LARVAE DISPERSED?	(Y)	N

WHAT PERCENT AT 1st INSTAR?
(count 100) 100%

WHAT PERCENT AT 2nd INSTAR?
(count 100)

WHAT PERCENT AT 3rd INSTAR?
(count 100)

PARASITISM?	Y	N
LIST PARASITES		
PREDATION?	Y	N
LIST PREDATORS		

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%

WHITE OAK ✓

RED OAK ✓

OTHER ✓

COMMENTS

TABLE 12

SITE: Northern Floodplain

DATE: 4-22-88

TRANSECT: Parkside Dr

MONITOR: JS, CH, CS

EGG HATCH?	(Y)	N
<50% HATCH	(Y)	N
>50% HATCH	Y	(N)

LARVAE DISPERSING?	(Y)	N	By total egg mass count less than 50%
>50% LARVAE DISPERSED?	Y	N	
<50% LARVAE DISPERSED?	(Y)	N	
WHAT PERCENT AT 1st INSTAR? (count 100)	100%		
WHAT PERCENT AT 2nd INSTAR? (count 100)			
WHAT PERCENT AT 3rd INSTAR? (count 100)			

PARASITISM?	Y	(N)
LIST PARASITES		
PREDATION?	Y	(N)
LIST PREDATORS		

HOST	BUDS	BUDS	LEAF EXPANSION		
	SWELLING	BREAKING	<25%	25-50%	>50%
WHITE OAK					
RED OAK					
OTHER					
COMMENTS					

TABLE 13

SITE: PINEHURST

DATE: 4-22-88

TRANSECT: Beech Sl

MONITOR: JSICH

EGG HATCH?	(Y)	N
<50% HATCH	Y	N
>50% HATCH	(Y)	N

LARVAE DISPERSING?	(Y)	N
>50% LARVAE DISPERSED?	Y	N
<50% LARVAE DISPERSED?	(Y)	N

WHAT PERCENT AT 1st INSTAR?
(count 100)
WHAT PERCENT AT 2nd INSTAR?
(count 100)
WHAT PERCENT AT 3rd INSTAR?
(count 100)

100%

PARASITISM?	Y	N
LIST PARASITES		
PREDATION?	Y	N
LIST PREDATORS		

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%
WHITE OAK				✓	
RED OAK					✓
OTHER					✓
COMMENTS					

TABLE 14

SITE: *Aberfoyle*

DATE: *4-30-83*

TRANSECT:

MONITOR: *C. Scott*

EGG HATCH?	☒ Y	N
<50% HATCH	☒ Y	N
>50% HATCH	Y	N

LARVAE DISPERSING?	☒ Y	N
>50% LARVAE DISPERSED?	Y	N
<50% LARVAE DISPERSED?	☒ Y	N

WHAT PERCENT AT 1st INSTAR? (count 100)	<i>40%</i>
WHAT PERCENT AT 2nd INSTAR? (count 100)	<i>60%</i>
WHAT PERCENT AT 3rd INSTAR? (count 100)	

PARASITISM?	Y	☒ N
LIST PARASITES		
PREDATION?	Y	☒ N
LIST PREDATORS		

HOST	BUDS SWELLING	BUDS BREAKING	LEAF EXPANSION		
			<25%	25-50%	>50%
WHITE OAK				☒	
RED OAK					☒
OTHER					☒
COMMENTS					

TABLE 15a-

AIRCRAFT CALIBRATION WORKSHEET

NAME: NFSDATE: 4/27/88Airspeed: 75 mphSwath: 150'AIRCRAFT: Sikorsky S-55FAA #: N6704APM: 22.5GPM: 17.04NOZZLE TYPE: 8004NO. OF NOZZLES: 47ORIENTATION: 90° downPRESSURE: 40CALIBRATION TOLERANCE: ±5%TRIAL # 1GALLONS IN PLANE: 50CALCULATED TIME: 2.96 minACTUAL TIME: 2.28 min

PERCENT DIFFERENCE: (Circle One)

Faster Equal Slower 30%

IS FLOW RATE ACCEPTABLE (Circle One)

Yes No

If no, describe possible solutions:

check nozzle tips + replace
where needed.

TRIAL # 2AIRCRAFT: Sikorsky S-55FAA #: N6704APM: 22.5GPM: 17.04NOZZLE TYPE: 8004NO. OF NOZZLES: 47ORIENTATION: 90° downPRESSURE: 40CALIBRATION TOLERANCE: ±5%GALLONS IN PLANE: 50CALCULATED TIME: 2.96 minACTUAL TIME: 2.38 min

PERCENT DIFFERENCE: (Circle One)

Faster Equal Slower 24%

IS FLOW RATE ACCEPTABLE (Circle One)

Yes No

If no, describe possible solutions:

check nozzle tips +
replace where necessary.
plug 4 nozzles.

TABLE 15b- AIRCRAFT CALIBRATION WORKSHEET

NAME: NFS

DATE: 4/

TRIAL # 3

AIRCRAFT: Sikorsky S-55

FAA #: N6704

APM: 22.5

GPM: 17.04

NOZZLE TYPE: 8004

NO. OF NOZZLES: 43

ORIENTATION: 90° down

PRESSURE: 38

CALIBRATION TOLERANCE: ±5%

GALLONS IN PLANE: 60

CALCULATED TIME: 3.52 min

ACTUAL TIME: 3.50 min

PERCENT DIFFERENCE: (Circle One)

Faster Equal Slower

IS FLOW RATE ACCEPTABLE (Circle One)

Yes No

If no, describe possible solutions:

TRIAL # _____

AIRCRAFT: _____

FAA #: _____

APM: _____

GPM: _____

NOZZLE TYPE: _____

NO. OF NOZZLES: _____

ORIENTATION: _____

PRESSURE: _____

CALIBRATION TOLERANCE: + %

GALLONS IN PLANE: _____

CALCULATED TIME: _____

ACTUAL TIME: _____

PERCENT DIFFERENCE: (Circle One)

Faster Equal Slower

IS FLOW RATE ACCEPTABLE (Circle One)

Yes No

If no, describe possible solutions:

TABLE 16

SORTIE REPORT

PROJECT: NPS - NCR

DATE: April 30 - May 1, 1988

INSECTICIDE: GYPCHER - BT

AIRCRAFT: Sikorsky S-55

APPLICATION RATE: 12 Bl in 9600/acre

Condoba

LOAD	TIME OUT	TIME IN	GALLONS	ACRES TREATED	COMMENTS
4/30 1	0630	0700	92	48	GYPCHER 1.5 gpa
				Temps - 40's	Winds 10-14 mph by
5/1 2	0625	0703	185	247	Landed & refuel
	0712	0741			
3	0755	0804	150	200	pressure drop - return to clean screens
	0820	0840			
4	0845	0910	150	200	completed Rock Creek Pk.
5	-	-	150	200	Treated violets look & Dickerson
6	1130	1210	150	200	completed Dickerson Block & Project.
TOTAL ACRES = 1095					

WEATHER DATA

	WINDSPEED	WIND DIRECTION	RELATIVE HUMIDITY	TEMPERATURE	TIME
5/1 1.	light	W	78%	44°F	0620
5/1 2.	light	W	60%	55°F	0830
5/1 3.	light	W	54%	67°F	1130

SOFTIE REPORT

DATE: May 9, 1988

AIRCRAFT: Sikorsky S-55

Cordeba

* Sites Completed:

Pinehurst (Sydney)

Nature Center (Gypchok)

Arlington Cemetery

Teddy Roos. Island

Glen Echo

Great Falls

Picnic Grove #10

Approx 120 gallons of BT mix
remaining in aircraft.

	WINDSPEED	WIND DIRECTION	RELATIVE HUMIDITY	TEMPERATURE	TIME
1.	light	variable	50%	55°	0555
2.					
3.					

SOFTIE REPORT

DATE: MAY 16, 1986

AIRCRAFT: Sikorsky S-55

Cordoba

$$\text{Acres Treated } (579-511) = 1047$$

	WINDSPEED	WIND DIRECTION	RELATIVE HUMIDITY	TEMPERATURE	TIME
1.	0	0	87%	62°F	0552
2.	light	W	80%	64°F	0820
3.	light	W	76%	67°F	0933
4.	light	W	72%	68°F	1123

fogged in

Figure 1.--1988 Treatment Areas in Rock Creek Park,
USDI National Park Service.

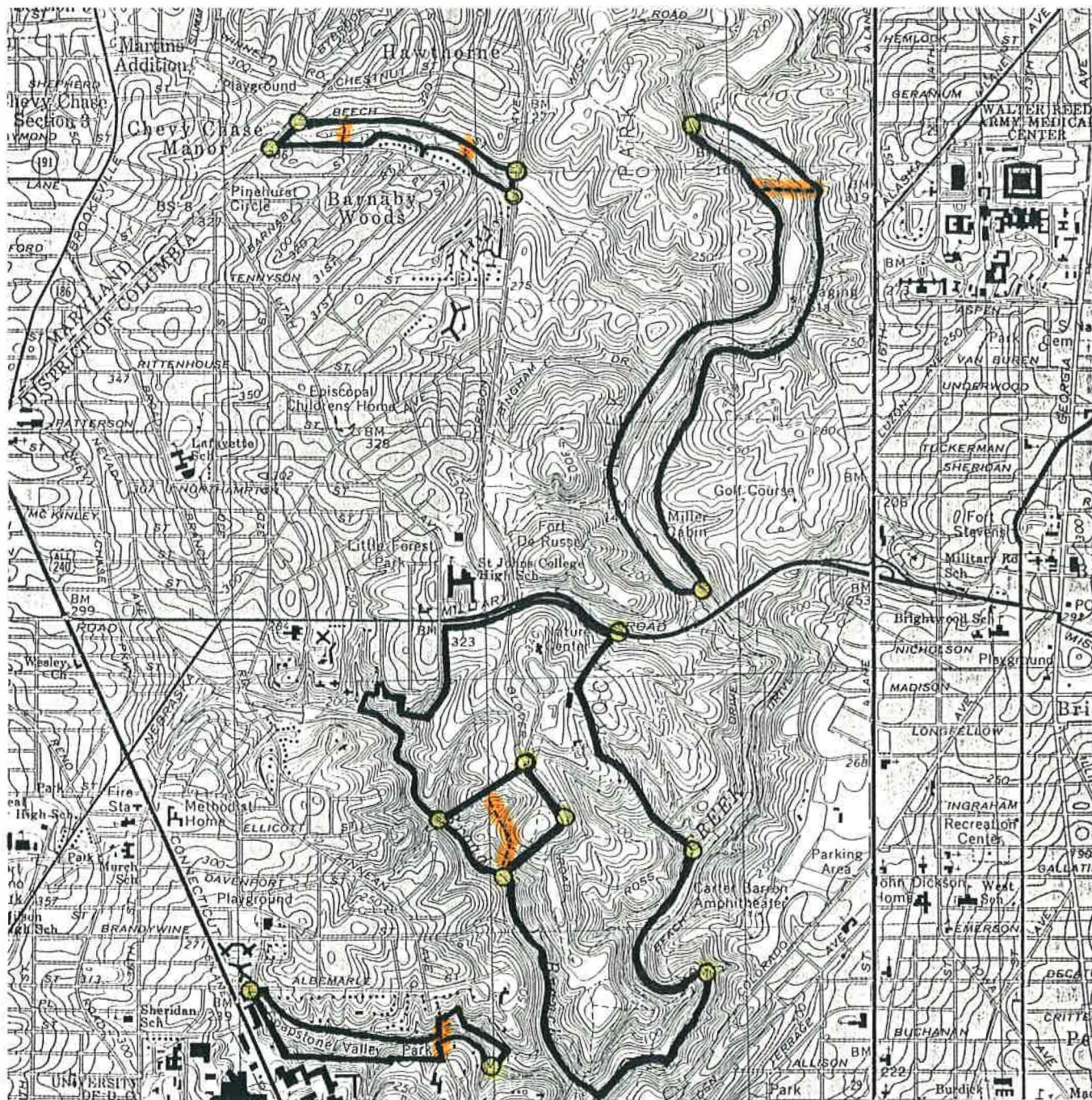


Figure 2.--1988 Treatment Areas in Rock Creek Park
Treated by the City of Washington, D.C.

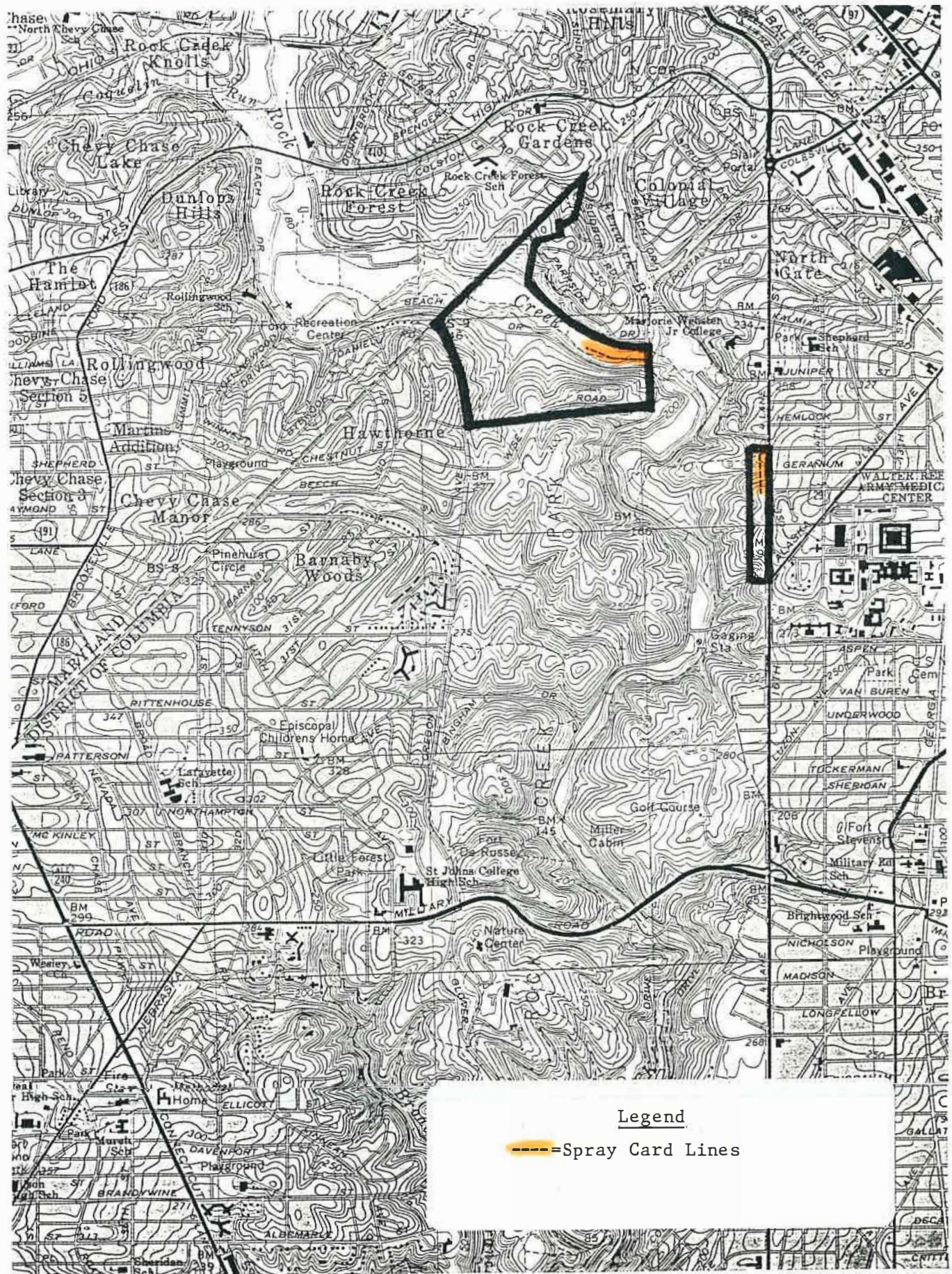


Figure 2.--(continued)

